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Influence of glass particle size on density, mechanical and thermal insulating properties of foamed glasses

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Initial particle size of glass powders has a great influence on foaming process in the production of foam glasses. It is accepted that it is possible to foam glass powders with particle size lower than 0.4 mm. However scientific and systematic investigations are lacking concerning the impact of particle size on foaming process. Since the foaming process strongly depends also on the type of foaming agent used and the composition-temperature-viscosity relation of glass melts, more in-depth investigations on different glass compositions and foaming agents are needed to reveal the influence of particle size. In this contribution, we foamed cathode ray tube (CRT) panel glass with the optimized type and amount of foaming agents. Glass powders were screened to obtain different particle size, which were than mixed with foaming agents and foamed at elevated temperatures. The results show that the foam density strongly decreases with decreasing particle size of glass powder. We analyzed the origin of this trend. Foaming was observed in samples with d_{50} value below 100 μm. We also measured compressive strength and thermal conductivity of the foam glasses.

Reference:

J. König, R. R. Petersen and Y. Z. Yue: "Influence of the glass–calcium carbonate mixture characteristics on the foaming process and foam glass properties", *J. Euro. Ceram. Soc.* **34** (2014) 1591-1598.